CLAIMS

We claim:

1. A liquid cooling system for cooling a plurality of electronic components comprising:

a plurality of thermal management blocks in thermal connection with said electronic components and capable of receiving a supply of liquid coolant, wherein said plurality of thermal management blocks absorb heat from said plurality of electronic components and transform said supply of liquid coolant into a supply of two-phase fluid having a vapor portion and a liquid portion, said plurality of thermal management blocks also fluidly connected to a plurality of return channels for transferring said supply of two-phase fluid to a heat exchanging return manifold;

wherein said heat exchanging return manifold is sized sufficiently for gravity to separate said liquid portion from said vapor portion;

wherein said heat exchanging return manifold contains a cold fluid channel for transforming said vapor portion into a condensed liquid; and

a pump fluidly connected to said heat exchanging return manifold and for transforming said liquid portion and said condensed liquid into said supply of liquid coolant.

2. The liquid cooling system of claim 1, further including a reservoir fluidly connected to said pump and for holding an amount of said liquid portion and an amount of said condensed liquid.

3. The liquid cooling system of claim 1, wherein said cold fluid channel is connected to a facility water system.

4. The liquid cooling system of claim 1, wherein said cold fluid channel is connected to a secondary cooling system.

5. The liquid cooling system of claim 4, wherein said secondary cooling system is a refrigeration system.

6. The liquid cooling system of claim 1, wherein said cold fluid channel sub-cools said liquid portion.

7. The liquid cooling system of claim 1, wherein said cold fluid channel sub-cools said condensed liquid.

8. The liquid cooling system of claim 1, wherein said supply of liquid coolant is a multi-component mixture.

9. The liquid cooling system of claim 1, wherein said plurality of thermal management blocks provide spray cooling.

10. A liquid cooling system comprising:

a plurality of thermal management blocks fluidly connected in parallel, said blocks creating a flow of two-phase cooling fluid for absorbing heat from a plurality of electronic components;

a heat exchanging return manifold fluidly connected to said plurality of thermal management blocks and containing a liquid cooling line;

wherein said heat exchanging return manifold is sized sufficiently to separate said two-phase cooling fluid into a generally distinct liquid fluid portion and a generally distinct vapor fluid portion; and

wherein said liquid cooling line causes said vapor fluid portion to condense.

11. The liquid cooling system of claim 10, wherein said liquid cooling line is connected to a facility water system.

12. The liquid cooling system of claim 10, wherein said liquid cooling line is connected to a secondary cooling system.

13. The liquid cooling system of claim 10, wherein said secondary cooling system is a refrigeration system.

14. The liquid cooling system of claim 10, wherein said liquid cooling line provides thermal management of said liquid fluid portion.

15. The liquid cooling system of claim 14, wherein said thermal management includes sub-cooling said liquid fluid portion.

16. The liquid cooling system of claim 10, wherein said two-phase cooling fluid is a multi-component mixture.

17. The liquid cooling system of claim 10, wherein said plurality of thermal management blocks are spray cooling thermal management blocks.

18. The liquid cooling system of claim 17, wherein said spray cooling thermal management blocks include at least one atomizer.

19. A method of removing heat from a two-phase electronic cooling system containing a plurality of thermal management units fluidly connected in parallel, said method comprising:

delivering a two-phase fluid from said plurality of thermal management units to a heat exchange return manifold;

sizing said heat exchange return manifold sufficiently to allow gravity to separate said two-phase fluid into a liquid portion and a vapor portion;

providing a liquid cooling line within said heat exchange return manifold for condensing said vapor portion; and

fluidly connecting a pump to said liquid portion.

20. The method of removing heat from a two-phase electronic cooling system of claim 19, further including connecting said liquid cooling line to a secondary cooling system.